

AMENDMENTS TO THE SPECIFICATION

- 1) Please amend the TITLE of the application as follows:

OSTEOTOM PNEUMATIC INSTRUMENT FOR TISSUE REMOVAL

- 2) Please amend the paragraph at page 1, lines 4-8 of the specification as follows, where "ostcoton" has been replaced with "osteotome."

The present invention relates to a surgical device, and in particular to an osteotom osteotome for the removal of bone and of bone tumors, as well as of ligaments and fibrocartilaginous tissue, during surgery, and in particular to an osteotom osteotome of the type comprising a pair of blades slidably coupled so as to be closable the one against the other at respective distal ends.

- 3) Please amend the paragraph at page 1, lines 9-15, where "osteotoms" has been replaced with "osteotomes."

Osteotome Osteotomes for the removal of bone tissue are known, which comprise a pair of parallel blades, the one slidable onto the other so that a bone fragment may be clamped between respective distal ends of the blades themselves and then removed. The sliding of one blade onto the other is generated directly by a surgeon via a handle formed by two rotatably connected levers, each one integral to a respective blade. By forcing said levers the one against the other, the surgeon actually closes the blades.

- 4) Please amend the paragraph at page 1, lines 16-19, where "osteotoms" has been replaced with "osteotomes."

Such known-art ~~osteotoms~~ osteotomes also envisage the interposition of an elastic resisting element between said levers, said element being apt to return the latter -and therefore the blades integral thereto- to the initial resting position when the surgeon releases the levers themselves.

- 5) Please amend the paragraph at page 1, lines 20-23, where "osteotoms" has been replaced with "osteotomes."

Over the last five decades, the above described known-art ~~osteotoms~~ osteotomes have been widely used for surgery requiring the removal of bone tissues, like, e. g. spinal, neurological and orthopedic surgery, ear, nose and throat surgery, maxillo-facial and thoracic surgery, and so on.

- 6) Please amend the paragraph at page 1, lines 24-34, where "osteotom" has been replaced with "osteotome" and "osteotoms" has been replaced with "osteotomes."

However, such known-art ~~osteotoms~~ osteotomes suffer from some relevant drawbacks. In particular, the present invention is based on the observation that such ~~osteotoms~~ osteotomes, in order to be operated and to produce the removal of a bone fragment, require the exertion of a remarkable force by the surgeon, also due to the fact that the latter should overcome the resistive force of said resisting element. As surgery generally requires a continuous and repeated use of the ~~osteotom~~ osteotome, the operation modes of the known-art ~~osteotoms~~

osteotomes tire the surgeon, and in particular the ~~osteotom-operating~~
~~osteotome-operating~~ limb. Moreover, in the effort of operating the
~~osteotom~~ osteotome, the surgeon could impart undesired swinging
motions thereto. All of this affects surgery accuracy and safety, and
prolongs the related times.

7) Please amend the paragraph at page 1, lines 35 through page 2, line 2, where "osteotom" has been replaced with "osteotome."

Hence, the technical problem underlying the present invention is that of providing a surgical device, and in particular an ~~osteotom~~
osteotome, allowing to overcome the drawbacks mentioned hereto with reference to the known art. Such a problem is solved by a surgical device according to claim 1.

8) Please amend the paragraph at page 2, lines 8-14, where "osteotom" has been replaced with "osteotome."

The present invention provides some relevant advantages. The main advantage lies in the fact that the surgical procedure is optimized in terms of accuracy, safety and times. In fact, the presence of propelling means for the slideable blade interposed between the latter and suitable operation means apt to be handled by the user dispenses the surgeon from directly providing the operating force of the ~~osteotom~~ osteotome blades. Hence, during surgery the operator's attention may entirely focus on the structures to be removed.

9) Please amend the paragraph at page 2, lines 15-31, where "osteotom" has been replaced with "osteotome."

Other advantages, features and the modes of employ of the present invention will be made apparent in the detailed description of some embodiments thereof, given by way of example and not for limitative purposes. It will be made reference to the figures of the annexed drawings, wherein:

Figure 1 shows a top perspective view of an embodiment of the osteotom osteotome according to the present invention;

Figure 2 shows a bottom perspective view of the osteotom osteotome of Figure 1, Figure 3 shows a longitudinal sectional view of the osteotom osteotome of Figure 1;

Figure 3A shows a cross sectional view of the osteotom osteotome of Figure 1, taken along line B-B of Figure 3;

Figure 3B shows a schematic representation of a portion of a pneumatic circuit of the osteotom osteotome of Figure 1;

Figures 4A and 4B each show a side view of a detail of the blades of the osteotom osteotome of Figure 1 and of a variant of such detail, respectively; and

Figures 5A to 5C illustrate the modes of employ of the osteotom osteotome of Figure 1, each showing a perspective view thereof during use in surgery.

10) Please amend the paragraph at page 2, lines 33-34, where "osteotom" has been replaced with "osteotome."

Referring initially to Figure 1, an osteotom osteotome according to an embodiment of the invention is generally indicated by 1.

11) Please amend the paragraph at page 3, lines 1-4, where "osteotom" has been replaced with "osteotome."

The ~~osteotom~~ osteotome 1 comprises a main body 2 -or handpiece- apt to be handled by a user, and a pair of blades, and specifically a first blade 3 and a second blade 4, which in the present embodiment are removably connected to the main body 2 according to modes that will be illustrated later on.

12) Please amend the paragraph at page 3, lines 5-7, where "osteotom" has been replaced with "osteotome."

The main body 2, serving as chassis of the ~~osteotom~~ osteotome 1, comprises a portion 20 apt to be handled by the surgeon by a single hand; the other hand may be used to hold the blades during surgery.

13) Please amend the paragraph at page 3, lines 10-11, where the term "slidably" has ben correctly spelled and "osteotoms" has been replaced with "osteotomes."

The blades 3 and 4 are located parallel and side-by-side and are ~~slidably~~ slidably coupled the one to the other, as in known-art ~~osteotome~~ osteotomes.

14) Please amend the paragraph at page 3, lines 12-20, where "osteotoms" has been replaced with "osteotomes."

As it is shown in greater detail in Figure 4, and always as in known-art ~~osteotome~~ osteotomes, such blades 3 and 4 have respective cutting distal ends, indicated by 31 and 41, respectively, mutually closable the one against the other for the removal of a bone fragment or other biological material during surgery. For this purpose, the second blade 4 has, at the end 41, a slant with respect to the predominant

direction of development of the blades themselves. In particular, in Figure 4A there has been depicted a blade 4 having, at the distal end 41, a slant of about 30 degrees with respect to the vertical.

15) Please amend the paragraph at page 4, lines 21-24, where "osteotom" has been replaced with "osteotome."

The pneumatic propelling means 6 further comprises an intake 9, in form of pipe holder, for supplying compressed air from the outside, and in particular for connecting the ~~osteotom~~ osteotome 1 to the pneumatic system of the operating theatre.

16) Please amend the paragraph at page 5, lines 20-27, where "osteotom" has been replaced with "osteotome."

Hence, it will presently be appreciated that in order to produce the motion of the top blade 3 the surgeon should merely apply a light force onto the trigger or push button 11 in order to overcome the resistive force of the elastic element 15. The operation via a trigger or equivalent system, requiring a minimal force, causes no undesired motions or swinging of the entire ~~osteotom~~ osteotome, as instead occurring in known-art systems. Moreover, there are no problems of the ~~osteotom~~ osteotome interfering with other instruments or elements in the surgical field, like e. g. self-retaining retractors.

17) Please amend the paragraph at page 6, lines 2-7, where "osteotom" has been replaced with "osteotome."

Always with reference to Figures 3 and 3B, the ~~osteotom~~ ~~osteotome~~ 6 further comprises means 16 for adjusting the closing speed of the blades 3 and 4, which in the present embodiment is implemented by a flow regulator operable at the base of the main body 2 and partially visible also in Figure 2. This flow regulator 16 is apt to control the flow resistance at the pneumatic circuit portion associated with the cylinder bottom region 13.

18) Please amend the paragraph at page 6, lines 13-16, where "osteotom" has been replaced with "osteotome."

Moreover, as it is schematically shown in Figure 3B, the ~~osteotom~~ ~~osteotome~~ 1 may further allow an adjustment of the closing force of the blades 3 and 4 by a pressure regulator R located externally thereto and incorporated in the pneumatic system of the operating theatre.

19) Please amend the paragraph at page 6, lines 17-19, where "osteotom" has been replaced with "osteotome".

Of course, variant embodiments may envisage implementation modes of the rate and/or of the closing force of the ~~osteotom~~ ~~osteotome~~ blades alternative to the above-described ones.

20) Please amend the paragraph at page 6, lines 20-29, where "osteotom" has been replaced with "osteotome."

In the present embodiment, the ~~osteotom~~ ~~osteotome~~ 1 also comprises means 17 for inhibiting operation of the propelling means 6. In the

present example, such means 17 comprises a block valve, it also indicated by 17, apt to deny the pneumatic circuit portion associated with the cylinder bottom region 13. The means 17 are operable by the surgeon, e. g. via a simple push button mechanism located at the base of the main body 2, in order to allow a safe pass of the ~~osteotom~~ osteotome to other operators, e. g. to a medical assistant. In fact, when such means 17 is inserted there is no risk that the assistant, accidentally pressing the trigger 11 while cleaning the blades 3 and 4, be wounded due to the abrupt closing thereof.

21) Please amend the paragraph at page 8, lines 9-12, where "osteotom" has been replaced with "osteotome."

Hence, the ~~estetom~~ osteotome of the invention may also be provided in form of surgery kit, such a kit comprising said main body 2 apt to be handled by a surgeon and a plurality of pairs of osteotomic blades removably connectible thereto, i.e. to the propelling means for the slidabile blade.

22) Please amend the paragraph at page 8, lines 13-16, where "osteotoms" has been replaced with "osteotomes."

Such a provision in form of kit also entails the advantage of smaller dimensions of the entire assembly on operating tables as well as in sterilization baskets with respect to the traditional ~~estetoms~~ osteotomes, in which to each blade type there correspond an entire different instrument.

23) Please amend the paragraph at page 8, lines 22-23, where "osteotom" has been replaced with "osteotome."

By now, the modes of employ of the ~~osteotom~~ osteotome 1 will have been made apparent, and will only briefly be recalled herein.

24) Please amend the paragraph at page 8, lines 27-28, where "osteotom" has been replaced with "osteotome."

Then, previously to the blade mounting, the ~~osteotom~~ osteotome 1 is connected to the pneumatic system of the operating theatre via the intake 9.

25) Please amend the paragraph at page 9, lines 1-3, where "osteotom" has been replaced with "osteotome."

Moreover, when the ~~osteotom~~ osteotome 1 is passed to an assistant, or anyhow when it is not to be used, there may be inserted the inhibiting means 17 for ensuring operator's safety.

26) Please amend the paragraph at page 9, lines 28-32, where "osteotom" has been replaced with "osteotome."

Furthermore, the ~~osteotom~~ osteotome is less bulky than the known art systems, which are bound to the bulkiness associated with the opening of the operation levers. This prevents the occurrence of the abovementioned problems of interference of the ~~osteotom~~ osteotome with other instruments or elements in the surgical field.

27) Please amend the paragraph at page 9, line 33 through page 10, line 2, where "ostcoton" has been replaced with "osteotome."

Moreover, in known-art systems the need to grasp in one hand the blades wide apart is another relevant drawback, since such a holding is cumbersome for a small-handed surgeon. Evidently, this drawback as well is overcome by the ~~osteotom~~ osteotome of the invention, in which the main body may have a reduced-size holding portion.

28) Please amend the paragraph at page 10, lines 14-23, where "ostcoton" has been replaced with "osteotome."

For example, the ~~osteotom~~ osteotome of the invention may provide means for coupling to or for cooperating with a neuronavigation system, e.g. one or more position sensors, and hence be employed in the context of a surgery apparatus comprising said neuronavigation system. This allows a mapping of the bone to be removed, and therefore the real-time assessment of the work already carried out and to be carried out, optionally with a three-dimensional virtual representation of the anatomic structures to be preserved, studied with MR, TC, and scopy. Embodiment variants could also provide an integration with robotized systems apt to automatically carry out some repetitive and pre-codified surgical procedures.